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realm of real life, and the "body or soma is a subsidiary appendage," a "deciduous growth which arises round about the real links of life."

Thus in the realm of real life the chick is potential, and in the subsidiary realm or body life it becomes phenomenal or active, and these two realms are included in the constitution of the egg. In the nuclear substance or realm of real life the chick is in some way perfectly formed. This may seem inconceivable, yet it remains a fact. Preformation, in some way or other, demands our recognition. And it is in perfect agreement with the logic of the expression: The egg contains a potential chick.

When we predicate of a thing that it *contains* something, we have *two* distinct ideas in our mind. As when we say the bottle contains wine. Here the bottle is one idea, and wine is the other idea. Just so when we say the egg contains a potential chick. Here, however, we do not refer to the egg-shell and its contents, as in the case of the bottle and its contents—the wine. No; here the concrete egg with its body plasma and nutritive potency constitute one idea; and the formative potency and organising efficiency—that *unity* of organic forces which is capable of transforming the contents of the egg into a chick, inherent in the nuclear substance of the egg-cell in the yolk, constitute the other idea. The concrete egg contains an abstract and unknown quantity. And when we reduce this supersensuous, unknown quantity to a physical expression—not by any rules of mathematics but by gentle heat in an incubator or under a hen—we find it equals a chick. Hence the unknown quantity inherent in the egg being equal to a chick, our conclusion that the hen's egg contains a potential chick is correct.

DANIEL BRIGHT.

PHILADELPHIA, Pa.

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#### EDITORIAL REPLY.

Criticism is always welcome, and since Mr. Daniel Bright has discovered "defective logic" in an article of mine entitled "Are there things in themselves?" I take pleasure in publishing his arguments and will answer them as briefly as the complicated problem will permit.

In the article referred to I deny the existence of "Things in themselves" if the term be taken in its rigid meaning.

The "thing" is constituted by a definite form, using the word "form" in its evident significance. A chair is a seat with legs and a back serving the purpose of sitting. The form of the chair is the "chair in itself," if that term has any meaning at all. There is not an unknowable "chair in itself" of metaphysical existence which germ-like exists as a power, or a force, or a potency in the material that is being turned into a chair by the skill of a carpenter.

Accordingly, we may say, there are "forms in themselves," but not "things in themselves." In-itselfness, or absoluteness, is not any thing substantial but purely formal. Those eternal uniformities which are classified by scientists as laws of

nature are the conditioning factors of things. They are the moulds of all beings animate as well as inanimate; but there is not any "potentiality" which germ-like, in a process of unfurlment, evolves the actualised things of real existence. I said:

"Evolution is not, as the name suggests, a process of unfolding; evolution is, as Christian Friedrich Wolff calls it, an 'epigenesis,' i. e., the process of the additional growth of new formations. The chick is something different in kind from the egg. The unity of the egg-cell organism in the yolk is radically different from the unity of the full-fledged chick. The former shows traces of irritability but not of consciousness, while the latter exhibits unmistakable symptoms of psychical activity. The formation of the chicken-soul is a new formation as much as the growth of feathers. The feathers of the chick are an additional growth; there are no latent feathers in the egg. We might express ourselves to the effect that the egg contains the potential existence of feathers, but with the same logic we might say the egg contains a potential chicken broth."

Here the term potential is incidentally introduced and the following remarks are made to show that potential existence is practically identical with that which is possible, but cannot denote either mystical "forces," or "metaphysical entities," or "things in themselves." I said in the same article:

"The terms potential existence, and latent qualities are fertile and useful ideas but we must beware not to employ them incorrectly. Any heap of iron ore may be called a potential sword. This is a mode of speaking which expresses the possibility that the ore can be changed somehow into a sword. But the sword does not exist at all in, not even as a latent quality of, the ore. The ore has no latent qualities of that kind. Those qualities of the ore which represent the potential sword are very patent to everybody who knows the art of using them properly and changing them into an actual sword.

"We may say that the hen's egg contains a potential chick; but this is a mere mode of speech devised to say that the egg can be changed into a chick under certain conditions. There is no chick at all contained in the egg and nothing that is like a chick."

Having read Mr. Bright's criticism I see not one word in the objectionable passages which I would retract. I have used the word potential in the traditional sense as that which can be (*τὸ κατὰ δύναμιν*) and deny only that the egg (the thing which can become a chick) is or contains a chick. An egg is a plexus of physiological tissues, a thing which is radically different from a chick, the latter being a living animal, a physical entity, a being endowed on a small scale with sensation, intelligence and purposive action or will, all of which qualities are glaringly absent in the egg.

The quotation of the objectionable passages in their context seems to me sufficient to dispose of Mr. Bright's criticism were the problem not more complicated and deserving of more elaborate treatment. The opposition which Mr. Bright makes

is based upon a difference between the egg and the chicken broth. I am quite aware of this difference and would be the last to deny its importance. I only deny that there is any difference between the two except a difference of kind. The difference is that in one case the most salient factors lie in the egg itself, and in the other they lie somewhere else; but in neither case do they lie exclusively here or there, nor is the potentiality any mysterious disposition in the egg, as a thing that remains identical through all changes.

In Aristotle's philosophy the term potential (*κατὰ δύναμιν*) plays an important part. The potential is contrasted with the actual i. e., that which has been perfectly realised (*κατὰ ἐντελέχειαν*). The art of architecture may be called the potentiality of housebuilding as may also the material of which houses consist:

Schwegler says (as quoted by Fleming in his *Vocabulary of Philosophy* p. 11, *sub voce* ACTUAL):

"The relation of the *potential* to the *actual* Aristotle exhibits by the relation of the raw material to the finished article; of the unemployed carpenter to the one at work upon his building; of the individual asleep to him awake. *Potentially* the seed is the tree, but the grown-up tree is it *actually*; a potential philosopher is the philosopher not philosophising; even before the battle the better general is the potential conqueror; in fact, everything is potential which possesses a principle of motion, of development, or of change; and which, if unhindered by anything external, will be of itself. *Actuality* or *entelechy*, on the other hand, indicates the perfect act, the end as gained, the completely actual (the grown-up tree, e. g., is the entelechy of the seed-corn), that activity in which the act and the completeness of the act fall together, e. g., to see, he thinks and he has thought, he sees and he has seen, are one and the same, while in these activities which involve a becoming, e. g., to learn, to go, to become well, the two (the act and its completion) are separated" (Schwegler, *Hist. of Phil.*, Stirling, p. 108).

The words "potential" and "possible" are derived from the same root, and mean etymologically the same, signifying that which can be. But potential is more closely related to the noun *potentia*, i. e., power (*δύναμις*) of potency which conveys the idea of a dynamic conception of performing some deed or attaining some ideal aim. And this linguistic implication actually seems to dominate Mr. Bright's thoughts, for again and again he speaks of the "power" of the egg to become a chicken, which "is a quality inherent in its constitution." He also speaks of "the persistent forces immanent in the egg." He says "the word potential relates to potency and not to substance" and defines potential as follows:

"For a thing to be a potential something else it must contain the power in itself, as a quality of its own nature, to become or produce that something else."

Aristotle's conception of potential differs from Mr. Bright's, but we shall not enter into questions of purely historical importance. Everybody has to a certain extent the right to form his own terminology. But then we must insist upon the utter indifference of the dynamical forces stored up in the egg and the paramount

importance of the form in which they are arranged. We do not know the secret of this arrangement, but we know that the energy stored up in an ostrich egg or in an eagle's egg, or in a chicken's egg, is not the determinant factor of the future fate of the egg, but its constitution, viz., the arrangement of its chemical ingredients. Neither the mass of the germ substance which is minimal seems essential, nor do the forces of the tiny little bit of energy contained in the substance seem to play a prominent rôle in the process. Everything depends upon the form which in its minute details is still unknown to us. Forces or power (viz., mechanical energy) is added to the egg from the outside by brooding and also some substance, especially oxygen, is admitted through the process of the shell. The external world co-operates in bringing about the result of the development of the egg; and this co-operation is indispensable for bringing about this wonderful transformation which changes an egg into a little chick.

There is a little German toy in the market called, I believe, "The little artist." It is a figure with a pencil in hand, the arm being moveable and connected with levers leading to a wheel underneath upon which a pattern of two lines cut in zinc can be placed, the one determining the vertical position of the pencil, the other the horizontal. The pattern can be changed, and the little artist draws pictures as soon as the crank is turned, and, of course, the pictures depend upon the pattern. Here the pattern is the potential picture. The pattern is not a picture at all; it contains no picture, nor does it in any way resemble a picture. Yet the form of its lines will, if inserted into the little machine, guide the pencil and thus produce a definite picture.

Potentiality is neither a matter of power nor of substance, but of form.

Mr. Bright believes that if an egg is transformed into a chick, it must contain a chick. He says:

"The adage is 'like begets like,' but if nothing is contained in a hen's egg that is like a chick, it is evident that nothing that is like a chick could come out of it."

The truth is that very frequently and undeniably things of one kind are changed into things of another kind. A heap of nebulous gases is changed into a solar system; the fiery surface of a planet cools down and is transformed into a theater of life and moral aspirations. Hemp is woven into clothes, worn to rags and at last turned into paper to become books. Everywhere we are met with transformations where radically new things appear which can not be said to have existed before potentially anywhere except in the ideal realm of the possibility conditioned by the eternal laws of form and actualised through the changes wrought by combination and separation.

Mr. Bright's error is based upon a misconception of what he calls the equivalence of energy. He says:

"According to the law of transformation and equivalence of energy the human mind is forced to conclude that everything that appears in the transformed and actual state of a thing must have had its equivalent in the former, or potential, state

from which it was transformed. Therefore, as the chick is but the transformed state of the egg the conclusion that the feathers on the chick had their corresponding equivalence in the forces of the organic constitution of the egg, cannot be avoided."

Every thing is some thing and can in combination with other things be changed into innumerable new things. The new things are the potential things of Aristotle and to speak of them as being contained in the old things is, to say the least, very misleading. Mr. Bright says:

"When we say a thing *contains* something we have distinctly *two* ideas in our mind. As when we say the bottle contains wine. Here the bottle is one idea and wine is the other. Likewise when we say the egg contains something. In this case, however, we do not refer to the egg-shell and its material contents, as in the case of the bottle and its contents—the wine. But the concrete egg with its nutritive potency or energy is one idea; and the formative potency, or organising efficacy inherent in the egg-cell in the yolk is the other idea. The egg in its totality possesses these two distinct classes of energy—formative and nutritive. The concrete egg contains an abstract and unknown quantity. And when we reduce this supersensuous, unknown quantity to a physical expression,—not by any rules of mathematics, but by gentle heat in an incubator or under a hen,—we find it equals a chick."

Aristotle's usage of the term potential and actual is not very satisfactory; but when he says that certain things are possessed of potentiality, he uses a figure of speech meaning that they can be transformed. Mr. Bright insists on the egg as containing a potential chick, saying that "the concrete egg contains an unknown quantity" which by brooding is reduced to a physiological expression, called a chick!

That "unknown quantity" of which Mr. Bright speaks is no quantity, but a quality; it is a definite form, analogous to the form of a pattern in machines.

We must insist that the term potential, convenient as it may be for many purposes, is dangerously ambiguous. The potential is that which will be or may be, but it is not contained in the things from which, or in minds of people through whom, it is actualised.

An American boy baby may be called a potential president of the United States, but for that reason he does not contain an unknown quantity of any kind. Aristotle speaks of dissolution as inherent in compound things, (book IV., ch. xi.) which means that all living bodies are subject to decay, or to use Mr. Bright's terminology "contain potential corpses."

Obviously, it is dangerous to take figurative terms seriously and understand them in a literal sense.

And why is the potential egg of special interest? Because it is the typical illustration of a wrong conception of the development of the world, based upon a false allegory. The world egg plays a prominent part in almost every mythology.

"The difference between an egg and the primitive condition of world system, is this: A chicken existed before the egg, and the egg develops a chicken because it represents the life-memories of many millions of chicken ancestors. The egg would not exist but for the hen. The hen transmits certain forms of motion which are the sum total of all the experiences of herself and her ancestors to a part of her body, *the ovule*. The ovule, when fertilised, grows and is excreted as an egg.

The famous question, "Which was first, the hen or the egg?" must be answered: "Neither." Living protoplasm was first, which under certain conditions produced the egg-bearing hen.

In a certain sense a nebula contains all the conditions for producing a planetary system and, on the surface of its planets, of living beings such as we are. Matter, the substance of a nebula, it must be assumed, possesses the qualities of motion and irritability, which by proper organisation become sentiency. The world-material can, merely through certain combinations in a long process of evolution, develop the higher forms of existence, organic life, consciousness and rational will. This evolution is inherent in existence through that impalpable something which we call laws of form; yet there is nothing in the world-process that evolves transmitted memories containing a special form of life and that form only. There is no world-hen who imparted her experiences and intelligence to the produce of her creatures.

A stellar nebula is a potential solar system, animated on its planets with rational beings. So the egg is a potential chick. The development of both is determined by their constitution, but while in the former the eternal laws of nature seem to play the most important part, the latter is typically a repetition of prior action and is a new start for the reappearance of the type of its ancestors.

The law of the conservation of matter and energy declares that the sum total of all energy and the sum total of all matter remain constant in the entire system of the universe. That which is not constant is the form; and new forms can be produced from the old forms in an unlimited amount of possibilities. But the changes of form take place according to eternal laws of form the recognition of which assists us both in tracing the process of evolution and in forming as well as realising our ideals of life.

P. C.

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#### BRINTON'S THEORY OF THE ORIGIN OF RELIGION.

In the winter of 1891 a movement was started in Philadelphia for the purpose of instituting popular courses in the History of Religions. Each course was to consist of from six to eight lectures and the engagement of lecturers, choice of subjects, etc., were to be in the hands of a committee chosen from different cities and representing various institutions and associations. The first course was given by Prof. T. W. Rhys-Davids, Ph. D., LL. D., of London, England, on the subject, *The History and Literature of Buddhism*. As the second lecturer, the late Prof.